

CHAPTER 10

LIQUID PRECIPITATION ACCUMULATION SENSOR (RAIN GAUGE)

SECTION I. DESCRIPTION AND LEADING PARTICULARS

10.1.1 INTRODUCTION

The liquid precipitation accumulation sensor (rain gauge) is a heated tipping bucket rain gauge manufactured by the Frise Engineering Company. The rain gauge is a custom ASOS configuration, modified Model 7405HA. This section describes the modified Model 7405HA used in the ASOS and its physical attributes.

10.1.2 PHYSICAL DESCRIPTION

The rain gauge (Figure 10.1.1) is a free-standing receptacle for measuring precipitation. The rain gauge contains an open top, which measures approximately 1 foot in diameter, that allows precipitation to fall into the upper portion, referred to as the collector. The collector is heated to melt any frozen precipitation, such as snow or hail, for collection. Collected water is funneled to a mechanical device (tipping bucket), which incrementally measures the accumulation and causes the momentary closure of a switch (either a reed switch or a mercury switch) for each increment. The tipping bucket is designed to measure in increments of 0.01 inch of rain. As water is collected, the tipping bucket fills to the point where it tips over. This action empties the bucket in preparation for additional measurements, closes the momentary switch, and signals another 0.01 inch of precipitation to the DCP. Water discharged by the tipping bucket passes out of the rain gauge through a lower funnel to the ground below. The physical design provides for the adaptation of the rain gauge to the standard ASOS mounting flange, with the collector portion located approximately 48 inches above the ground. At specified sites, a 48-inch diameter wind shield is installed around the rain gauge. The wind shield reduces wind updrafts and wind streamlines that alter rain trajectories.

10.1.3 RAIN GAUGE CONFIGURATIONS

Four configurations of the rain gauge (part number 90116) have been manufactured. Some earlier configuration gauges have been, and the rest are being, upgraded to the newest (-40) configuration. \$

- 10 This configuration can be identified by the mercury switch, mounted in a bracket to the bucket frame assembly. The mercury switch requires special consideration and handling during adjustment and shipping. If the mercury switch fails, it should be replaced by the reed switch.
- 20 This configuration can be identified by the reed switch and bracket mounted to the bucket frame assembly, the funnel extension added to the top funnel, and the brass stops on the tipping bucket.
- 30 This configuration is identical to the -20 assembly except that the tipping bucket has polyethylene stops instead of brass stops. The brass stops were susceptible to sticking to the bucket frame. For this reason, brass stops have been replaced with polyethylene stops secured by a screw and adhesive. \$

- § -40 This configuration replaces the magnet and magnet holder with a magnet/holder
§ combination. It also uses a self-tapping screw to mount the polyethylene stop to the bucket
§ instead of a screw and adhesive.

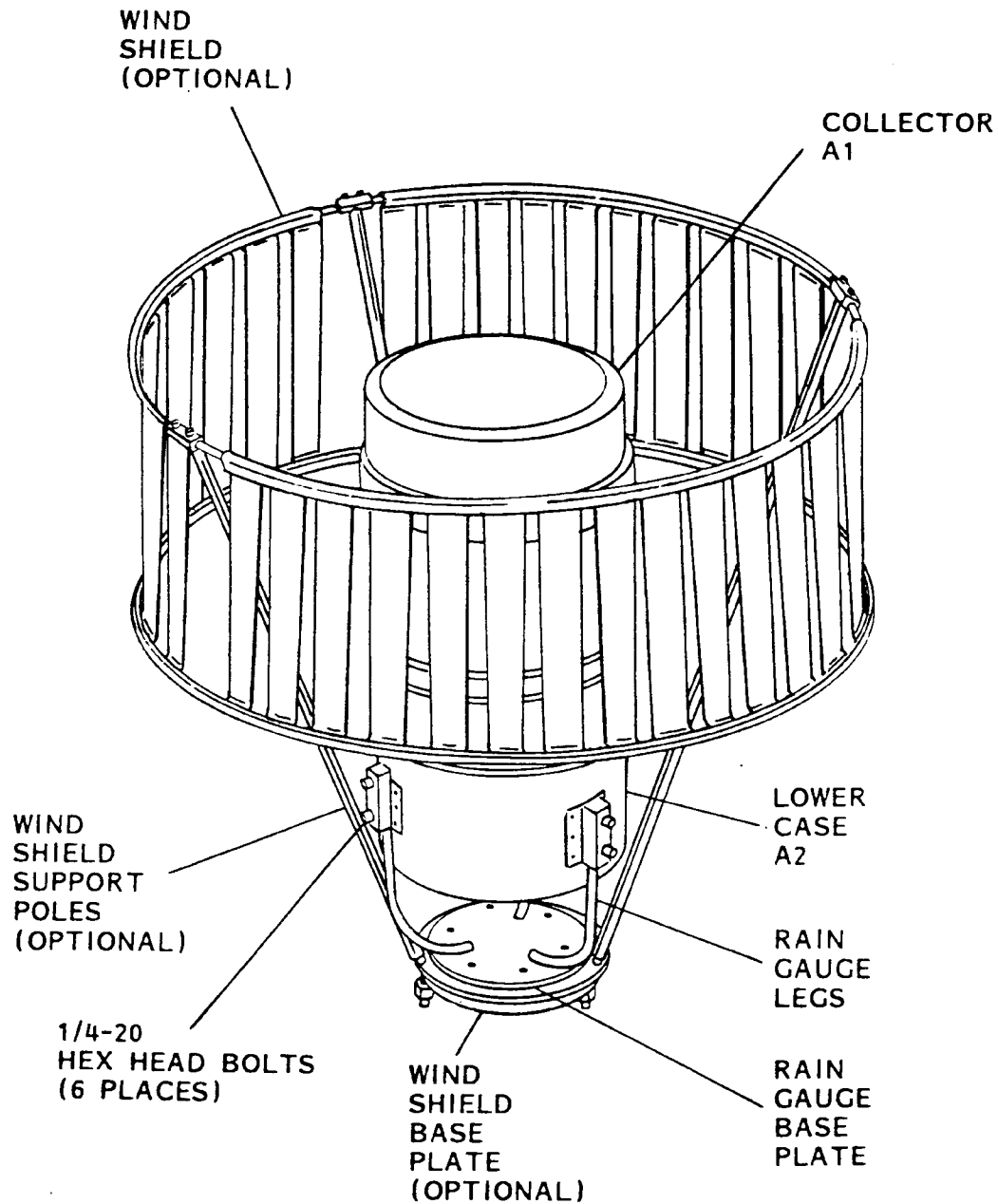


Figure 10.1.1. Liquid Precipitation Accumulation Sensor (Rain Gauge) (Sheet 1 of 3)

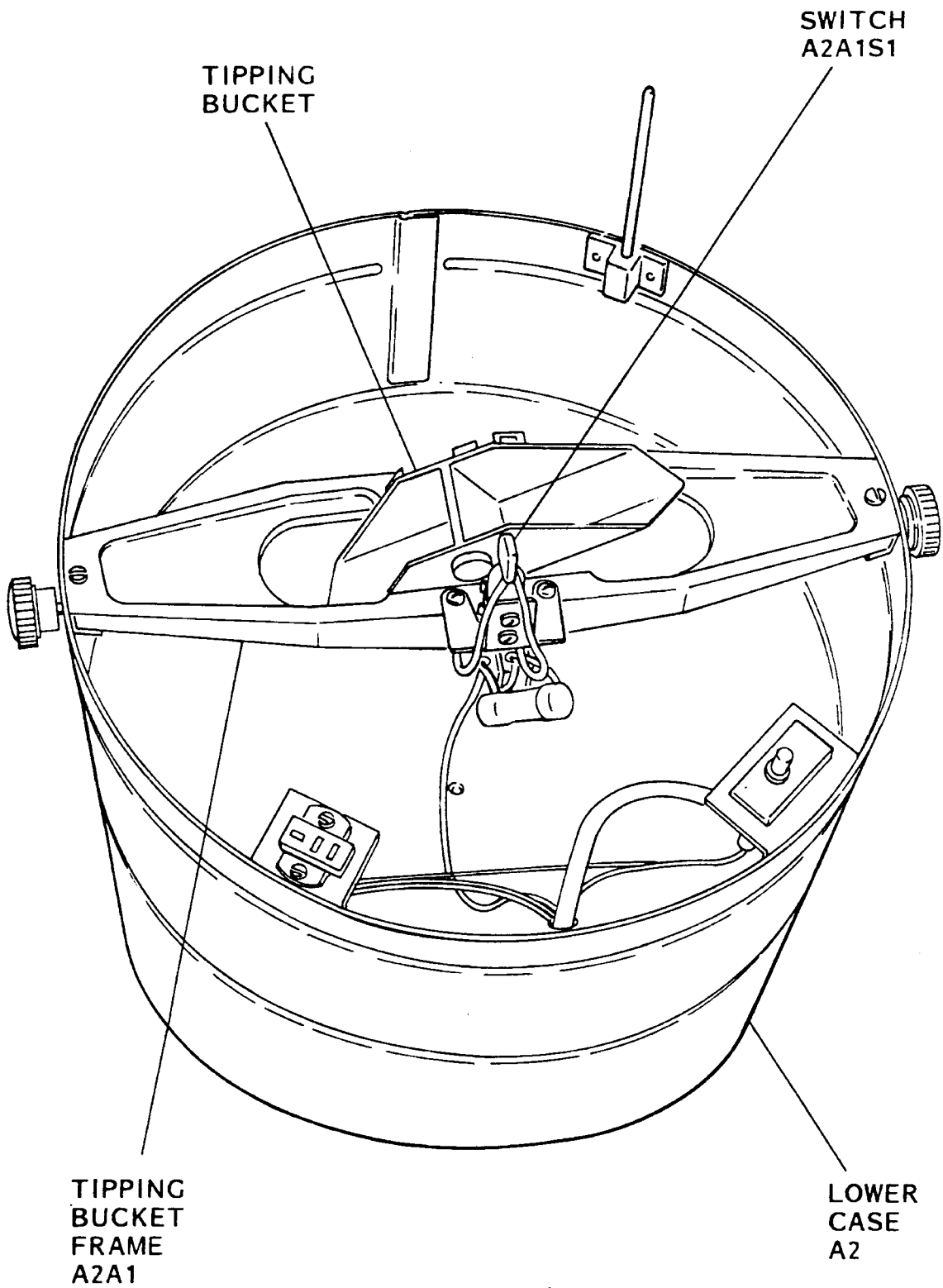


Figure 10.1.1. Liquid Precipitation Accumulation Sensor (Rain Gauge) (Sheet 2)

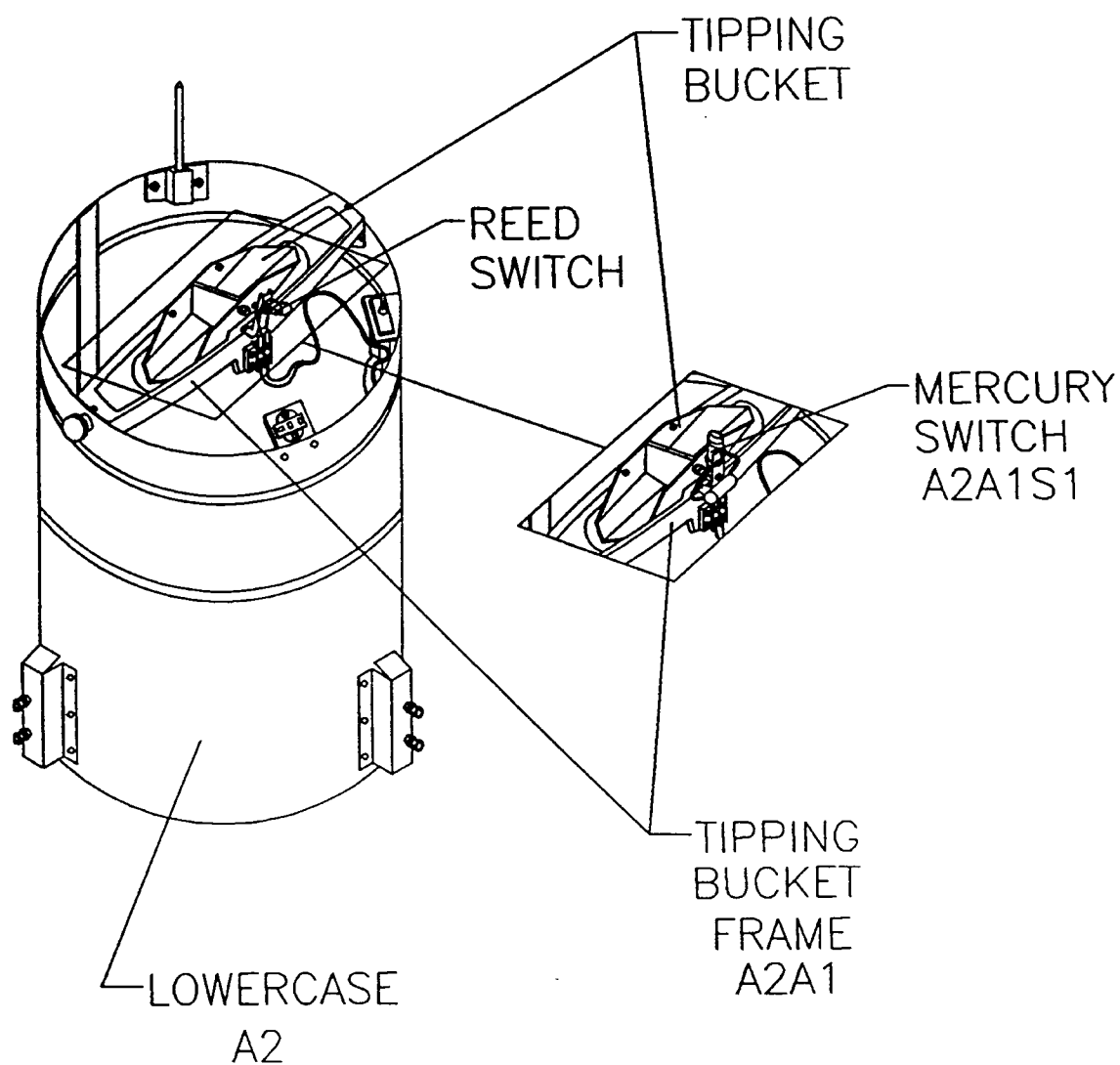


Figure 10.1.1. Liquid Precipitation Accumulation Sensor (Rain Gauge) (Sheet 3)